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# Eliminates Mandatory Fluoridation of City Water (Municipal Measure 51)

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# **City Club** of Portland

## **BULLETIN**

Portland, Oregon

Vol. 60, No. 49

**Benson Hotel, Mayfair Room**

**12:00 Noon**

**Friday, April 18, 1980**

### **THE PROGRAM:**

## **MAY BALLOT MEASURES: PRESENTATION, DISCUSSION AND VOTE**

### **REPORT ON ELIMINATES MANDATORY FLUORIDATION OF CITY WATER (MUNICIPAL MEASURE NO. 51)**

*The Committee:* Olive Barton, George W. Dana, M.D., Jan K. Kitchel, Charles J. Pruitt,  
Myra N. Rose, Lloyd B. Williams, Ann D. Kottkamp, *Chairman.*

*(This report is printed herein.)*

**AND**

## **A REVIEW OF PROPERTY TAXATION IN OREGON**

**AND**

### **REPORT ON STATE MEASURE NO. 5**

## **"CONTINUES TAX REDUCTION PROGRAM"**

*The Committee:* T. Shannon Buckley, M. Alexis Dow, Don A. Ellis, Gaulda L. Hahn,  
M. David Hooff, Rodney Lewis, Jr., Raymond L. Miller, Robert L. Weil,  
Charles F. Hinkle, *Chairman.*

*(This report was mailed separately as Vol. 60, No. 47, dated April 14, 1980.)*

**REPORT ON**  
**ELIMINATES MANDATORY FLUORIDATION**  
**OF CITY WATER**  
**(MUNICIPAL MEASURE NO. 51)**

**Purpose:** Repeals Section 11-107 of the Portland City Charter which requires fluoridation of water supplied through the municipal water works. Passage of this amendment would eliminate the mandatory requirement that Portland's water supply be fluoridated.

To the Board of Governors,  
City Club of Portland:

**I. INTRODUCTION**

Fluoridation of Portland's public water supplies to reduce tooth decay has been considered by City voters three times since 1956. This Committee was appointed to "re-study" the 1955 City Club report on "Fluoridation of the Public Water Supply" and consider more recent data to provide current information on the topic for City Club members and Portland voters.

At the present time, the City of Portland is not fluoridating its water despite a mandate by voters in 1978 to do so. Implementation of a fluoridation program has been halted by the City pending the outcome of the May 1980 vote. Measure 51 on the May 1980 ballot is sponsored by Citizens for Pure Water and the Oregon Citizen Research Council, Inc., by initiative petition. Passage of this Measure would remove the 1978 mandate. It is possible that at some future time, Portland City Council could pass a new ordinance requiring fluoridation which again would be subject to Oregon initiative and referendum laws.

Our investigation covered issues relating to:

- 1) *health and safety*, i.e., what is the current medical and scientific evidence concerning the benefits and hazards of water fluoridation?
- 2) *economics*, i.e., is the expenditure of city funds justified on an economic basis? Is water fluoridation the most cost-effective method for reduction of tooth decay in the general public?
- 3) *politics*, i.e., while fluoridation involves primarily health and safety, the battle over it has been consistently a political, moral and philosophical one.

The 1955 City Club report is a primary point of reference but it is not reproduced here (see Vol. 35, No. 42, March 25, 1955). While information concerning other purportedly harmful substances in the water and effects of fluoride on the environment was received, the Committee concerned itself only with fluoridation, its effects and direct and indirect consequences.

Of the 34 water districts which currently purchase water from Portland, one district (Wolf Creek Water District) adds fluoride. The ramifications of this vote on the water districts buying Portland water were felt to be beyond the scope of this study.

Persons interviewed individually or by the full Committee are listed in Appendix A. Materials reviewed are shown in Appendix B, and a glossary of terms appears as Appendix C.

## II. HISTORY AND BACKGROUND

The City Club of Portland approved a major report on fluoridation in March, 1955. The report was thorough; it discussed the physiology and growth of human teeth, definition and explanation of caries and the relation to diet, occurrence of caries in selected cities including Portland, and apparent correlations of the incidence of caries with amount of fluoride in the water supply. The report also considered adverse effects of fluoride in the water on health; engineering methods of introducing fluoride; and constitutionality. The report discussed arguments in opposition to fluoridation. Summary and findings of the report were as follows:

1. The fluoridation of public water supplies as a public health measure has been probably as thoroughly investigated as any public health measure ever proposed.
2. The overwhelming weight of dental, medical and other scientific opinion in the United States and Great Britain confirms fluoridation of public water supplies as a safe and economic way of cutting the incidence of dental caries by at least one-half.
3. The Committee has found no competent evidence in conflict with this overwhelming weight of scientific opinion.
4. Fluoridation of water supplies is not a substitute for dental care, but fluoridation with or without dental care achieves a substantial reduction in caries unobtainable by other means.

The recommendation of the report was strongly and unanimously in favor of fluoridation as a desirable public health measure.

In November 1953, the League of Women Voters of Portland had come to the same conclusions after studying the pros and cons. That report contains an extensive and useful bibliography of 60 references.

Those two reports clearly describe the meaning of fluoridation of a public water supply and the issues its practice raised for Portland in the mid-1950s. Ten years later the *New England Journal of Medicine* published a comprehensive article in which Dr. James Dunning reviewed the fluoridation issues of the mid-1960s in technical detail.<sup>1</sup> This article also concluded that fluoridation was desirable.

Since the first trials of controlled fluoridation were made in 1945, a vast literature has accumulated. Recent literature was provided by others, including Oregonians for Fluoridation and Citizens for Pure Water.

The 1955 City Club report indicated that there were few cities in Oregon at that time with fluoridated water. Recent figures prepared by the Oregon State Health Division indicate that there are presently 25 Oregon communities or water districts serving approximately 40,000 people with *naturally* fluoridated water [7-1.0 parts per million (ppm)] while approximately 24 communities serving approximately 350,000 Oregonians *adjust* the fluoride level of their water. (The Oregon cities with fluoridated water are listed in Appendix D.) Thus, about 16 percent of Oregon's population is drinking fluoridated water.

Figures prepared by the Idaho Department of Health and Welfare show that approximately 50 Idaho communities with a total population of about 203,000 people have "adequate" (0.7 ppm or more) fluoride levels (both natural or adjusted fluoridation). Figures provided by the State of Washington Department of Social and Health Services show that 14 Washington communities with a total population of approximately 31,000 have naturally fluoridated water and that Seattle and 42 other Washington communities with a total population of approximately 1.3 million adjust the fluoride levels of their water.

In 1970, over half of the population of the United States served by municipal water systems was being provided with fluoridated water at approximately 1.0 ppm, considered the optimal level.

Since 1944, fluoridation has been before Portland voters four times. In Portland, a measure favoring fluoridation was referred by the City Council in November 1956 (elec-

<sup>1</sup> James M. Dunning, D.D.S., M.P.H. "Current Status of Fluoridation." *New England Journal of Medicine*. January, 1965. pp. 30-33, 84-88.

tion results were 75,621 in favor, 105,519 against); in November, 1962, a similar proposal was sponsored by the Junior Chamber of Commerce by initiative (65,083 in favor, 79,217 against). In November, 1976, a *state* measure to prohibit adding fluorides to the water was referred to the voters by initiative petition. This measure failed 555,981 to 419,567.

In November 1978, voters in Portland passed an amendment to the City Charter which mandated fluoridation of the City's water supply. The vote was 71,151 in favor and 68,760 opposed; a total of 139,111 votes representing 59 percent of registered voters in the City.

The City hired the consulting firm of Brown and Caldwell to make recommendations on feasibility, type of fluoride and buffering to use and where to locate the fluoridation plant. Brown and Caldwell published its report in February, 1979, and concluded:

"Fluoridation of the Bull Run water supply for the City of Portland is feasible. Chemicals required to accomplish fluoridation are available in bulk at reasonable cost and without presenting major difficulties or hazards in handling and operation. Plant and equipment requirements are both modest in nature and widely used in other chemical handling and feeding applications, so that little or no difficulty is anticipated with an installation that will provide long-term, reliable operation.

The optimum combination of chemicals to provide fluoridation is fluosilicic acid with lime for pH correction. This will provide the desired treatment at lowest total annual cost, taking handling and corrosion problems into account.

Evaluation of corrosion potential from the standpoint of water quality characteristics indicates that corrosion potential exists in the Bull Run water supply, and that addition of fluoride chemicals will tend to increase that potential. This is due to the water's high quality, low degree of mineralization, and resulting low degree of buffer capacity. As a result, addition of the optimum fluoride chemical in the planned amount of 1 mg/1 F would reduce the pH of the raw water from approximately 7.00 to 6.50, contributing proportionately to increased corrosion potential. Addressing this corrosion potential by providing pH correction is essential to maintaining the integrity of the distribution system and the overall feasibility of fluoridation."

Recommendations of the Brown and Caldwell report are as follows:

1. The recommended chemical treatment of fluoridation of the Bull Run water supply consists of fluosilicic acid and pH correction. This will provide the required treatment with maximum cost benefit.

2. It is recommended that pH correction chemicals be selected giving due consideration to their compatibility with possible future requirements for chemical conditioning of water quality for corrosion control.

3. In light of apparent corrosion potential of the Bull Run water supply, increased corrosion potential associated with fluoridation and changes in disinfection practice under consideration by the Portland Water Bureau, and the magnitude of potential economic loss from sewer corrosion, it is recommended that the Bureau give serious consideration to further study of this problem.

4. For estimated budgetary purposes, the capital cost of the proposed facilities is \$430,000. First year cost for chemicals and operations and maintenance is estimated at \$159,000, assuming year-round water use averaging 110 million gallons a day."

The compound selected by the Water Bureau to fluoridate Portland's water supply was hydro-fluosilicic acid. In order to neutralize the corrosive effect of this particular compound on pipes (and avoid problems such as Seattle has been experiencing), lime will be added to the water as a buffering agent.

In September 1979, City Commissioners Frank Ivancie, Mildred Schwab, and Charles Jordan voted to halt progress on Portland's fluoridation program pending outcome of the May 1980 ballot measure, while Mayor Connie McCreedy argued that the project should stay on schedule as confirmed by the voters in November 1978.<sup>2</sup>

<sup>2</sup>Michael Alesko, "Council Delays Fluoridation, *The Oregonian*, September 20, 1979.

### III. ARGUMENTS ADVANCED IN FAVOR OF THE MEASURE

(and opposed to mandatory fluoridation)

The following arguments in support of the Measure were presented to your Committee:

1. The direct benefits of drinking fluoridated water have not been proven to be significant for adults.
2. There is no conclusive proof that ingestion of fluoride over long periods of time does *not* cause health problems of one kind or another. New evidence appears from time to time on previously unknown effects of fluoride, and high levels (as yet undetermined) of fluoride may be toxic to humans. The risk of introducing to the public water supply a chemical (fluoride) whose long-range effects have not yet been conclusively determined, may in time prove to greatly outweigh the presently known benefits.
3. Artificial fluoridation is a form of mass medication. There is no dental emergency in Portland which would morally justify the majority of voters inflicting medication on any portion of the public which objects, for any reason, to having to ingest an unwanted chemical.
4. Most of the costly fluoride and lime would be wasted because almost 98 percent of the City's water supply is used for non-drinking purposes. Fluoridation of a water supply to reach a specific segment of the population is an inefficient means of attacking whatever dental health problem the City may have.
5. The addition of the lime as a fluoride buffer will not necessarily prevent a corrosion problem for the City.

### IV. ARGUMENTS ADVANCED AGAINST THE MEASURE

(and in favor of mandatory fluoridation)

The following arguments against the measure were presented to your Committee:

1. There is a dramatic reduction of the incidence of dental caries in children living in areas where water is fluoridated, either naturally or through the addition of fluoride to the water supply, as compared to control groups without fluoride.
2. Fluoridation may also be beneficial when applied topically to the teeth of adults, and adults using fluoridated water as children enjoy improved oral health throughout their lives.
3. In many studies, some dating back to the mid-1940s, no harmful effects to the general public have been documented from controlled fluoridation of drinking water.
4. Fluoridation is the most cost-effective way of reducing dental caries within a community, one which is simple and effective, and one which does not discriminate among socio-economic levels.
5. Fluoridation is endorsed by every major national and international health organization (see Appendix E).

### V. DISCUSSION

Your Committee's deliberations were directed primarily toward arguments of long-range deleterious health effects vs. dental benefits; chemical compounds selected and possible "side-effects"; method of introduction of fluoride into the water supply; and the moral or political questions involved. Proponents of fluoridation base their stance on health benefits and cost-effectiveness to the total population. In earlier years, much of the opposition to fluoridation was couched in moral or philosophical terms, but as the fluoridation debate continued, opponents turned increasingly to scientific arguments. It has been stated that no truly long range studies of fluoridation have been conducted, although it is possible to look at populations whose water is and always has been naturally fluoridated.

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**A. Health.**

The Committee was not presented with any substantial scientific evidence to support arguments that long-term ingestion of fluoride at approximately one ppm causes health problems. Many doctors recommend that patients undergoing hemodialysis for kidney failure should not be exposed to fluoride or certain other chemicals in the water used for dialysis. Most hospitals and dialysis clinics routinely use de-ionizers to solve this problem. This patient group was referred to most often when pointing out substantiated deleterious health effects of fluoride. In 1973, however, the National Kidney Foundation issued a statement to the effect that optimally fluoridated water "does not harm the kidney nor does it have any harmful effect on patients undergoing dialysis."<sup>3</sup>

On the other hand, there is overwhelming evidence of the beneficial effect of fluoride which has reduced the incidence of cavities in children's teeth by as much as 65 percent in some instances, and may increase sixfold the number of children who grow up cavity-free. These studies have spanned the past three decades. As an example, reductions ranged from 20 percent to over 60 percent in decayed, missing and filled (DMF) teeth among groups of elementary age Salem, Oregon area children studied in the early 1970s.<sup>4</sup> That there is such evidence is acknowledged in the literature of those generally opposed to fluoridation, and by some opponents to fluoridation contacted by the Committee, although they question the validity of the statistics supporting this evidence. Opponents of fluoridation maintain that there are other practical means by which the same results can be reached, such as restricting sugar intake in the diet, proper oral hygiene and topical application of fluoride.

**B. Safety.**

On November 11, 1979 in Annapolis, Maryland, an estimated 1000 gallons of fluoride spilled into the city's water during a 17 hour period, due to human error and possible plant design faults at the water treatment plant. The Center for Disease Control (CDC) found "suggestive evidence" of possible fluoride poisoning in 13 of 70 persons interviewed after the spill, which was also a contributing cause of death of one man undergoing kidney dialysis (without a de-ionizer) at an Annapolis clinic. Eight days after the spill, fluoride levels in water tested were at 35 ppm. However, a CDC review of hospital emergency room admissions and school absenteeism showed no increases.<sup>5</sup>

Included in the proposed plans for the actual introduction of fluoride into Portland's water system are precautions to preclude such an occurrence. The operations center at the headworks, where the high fluoride alarms are to be located, is to be continuously manned by a qualified operator. This site is immediately adjacent to the fluoridation plant. The Water Bureau's Water Quality Laboratory is also located at the headworks, and is certified by the Environmental Protection Agency. A Water Bureau chemist will regularly sample the fluoride level to insure that instrumentation is properly calibrated. The fluoridation facilities themselves are designed to provide a set maximum level of fluoride (1 ppm @ 250 million gallons per day). The chemical flow will be monitored by a magnetic flow meter, and fluoride analyzers will be provided to monitor the concentration in each of the three conduits. Each analyzer will be equipped with high concentration alarms. A pneumatically operated flow control valve in the fluoride feeding system is designed to close upon loss of air supply, power, or control signal, thereby eliminating chemical flow. Even if every safety device failed, the 1/10 inch diameter throat on the magnetic control valve would allow only approximately 80 gallons per hour of hydro-fluosilicic acid into the system. Given the larger water flow rate in Portland, this is equivalent to a concentration of between 2-5 ppm. It is useful to note that waters with naturally occurring fluoride

<sup>3</sup>Public Health Service, U.S. Department of Health, Education and Welfare. "Kidney Patients undergoing Dialysis not Harmed by Optimally Fluoridated Water." PPB - 60. August, 1973.

<sup>4</sup>Dental Health Section, Oregon State Health Division. "Salem Dental Survey: 1971." April, 1971.

<sup>5</sup>"Series of Errors, Mistaken Judgment in Annapolis." *ADA News*. December 24, 1979.

concentrations of as high as 11 ppm million are used for domestic water supplies on a full time basis in several communities in the United States.

In light of the various interpretations of study results, opponents of fluoridation recommend that further work be done with respect to side effects of fluoridation, such as kidney disease and bone irregularities. Tooth mottling, an effect not generally observed below a 1.5 ppm level, was not considered by the Committee to be a pertinent factor given the 1.0 ppm level recommended by the City of Portland.

### C. Economics.

The total annual cost of fluoridation for Portland is estimated at \$213,000. The total capital cost is \$430,000 with a \$36,000 *annual cost* (amortized over 20 years at 5½ percent interest.) Chemical costs are \$86,000 per year for the fluoride and \$49,000 per year for the lime buffer. Operation and maintenance costs are \$42,000.

The cost of fluoridation in Portland has been estimated at 34¢ per person per year. It has also been estimated that for every dollar spent on fluoridation, between \$35-50 per person can be saved in other dental care expenditures.

Topical fluoride treatments are more expensive and therefore discriminate against lower income people. They are also not as effective as systemic fluoride in preventing tooth decay. Opponents of fluoridation state that the cost of a school mouth-rinse program is about \$60,000 to \$150,000 per year as opposed to fluoridating the public water supply at a cost of \$213,000. Multnomah County's current estimates for the 1978-79 school year for mouth-rinse programs in Portland and all of Multnomah County is \$2.50 per child, or \$107,500 based on 43,000 participating children out of 63,000 school children in Multnomah County.<sup>6</sup> Children benefit from fluoride even before they reach school age and a school program would miss this age group completely.

Statistics have shown that 99 percent of 16 year old children have had experience with DMF teeth. Proponents of fluoridation say that it is the most cost-effective, safe and practical way to reduce tooth decay in children, bringing about a 50 to 70 percent reduction. Significant cost savings in dental care are cited. In 1976, Oregon consumers spent an estimated \$11 million on fillings alone. For total dental work in Multnomah County alone, it has been estimated that consumers spent between \$12-21 million in 1976.

Fluoridating the water could also bring about a saving in dental insurance costs (rates). Areas without fluoridated water have been reported to have five times as many dental claims over \$50 as fluoridated areas.<sup>7</sup> Fluoridation would bring about a better use of public dental care dollars—the budget could be cut or the amount of care increased. Head Start dental care costs in fluoridated areas have in some instances been less than half those in non-fluoridated areas.<sup>8</sup> Adult and Family Services Division's dental expenditures in Multnomah County exceed \$1,485,000 per year. Assuming reduced treatment costs of 50 percent, savings to the taxpayers may be at least \$700,000 annually in this area alone.<sup>9</sup> It has been stated that, hypothetically, programs costing \$10 million would reduce caries in 300,000 children; the same money put into the treatment rather than the prevention of caries would affect somewhat less than 50,000 children.<sup>10</sup>

### D. Political.

Court challenges to fluoridation have failed in 16 states and the U.S. Supreme Court, by denying review, has permitted these rulings to stand. The Oregon Supreme Court held, in *Baer v. City of Bend*, that "the exercise of police power for protection of public health

<sup>6</sup>Dental Health Division, Multnomah County Health Department. "Fluoride Mouthrinse Program: Summary Statistics FY 1978-79," July, 1979.

<sup>7</sup>Health Affairs Committee, Portland Chamber of Commerce, "Fluoridation of Municipal Water Systems," September 20, 1978.

<sup>8</sup>Ibid.

<sup>9</sup>Ibid.

<sup>10</sup>Rich J. Carlsen. "Health in America." *The Center Magazine*. November/December 1972, pp. 43-47.



is not restricted to situations of overriding public necessity or emergency or infections or contagious disease."<sup>11</sup>

Perhaps the most difficult questions the Committee had to consider were the moral, philosophical and political aspects. Aside from a cost benefit analysis, whenever any mandatory health program is proposed or instituted, the voters must balance incursions on personal freedoms against the overall benefits to society. Few today would dispute the net benefits of a mandatory polio vaccine for school age children, for instance. In the area of dental health, some preventative effect from fluoride can be achieved by individual dosage through the use of chewable tablets or drops. While helpful, these methods are not as effective as fluoridation of the water supply because it has been demonstrated that the majority of households will not regularly use fluoride tablets or drops on a daily basis over the period of time necessary to achieve beneficial results.<sup>12</sup>

All Portland City Commissioners (or their office staff) were contacted by the Committee during this study. They expressed no opinion on Portland's fluoridation program.

## VI. CONCLUSIONS

1. The evidence considered by the Committee indicates that fluoridation in the concentration of approximately 1.0 ppm significantly reduces the incidence of cavities in young people aged 0-15 years.
2. Adults whose teeth benefited from fluoride as children experience fewer dental problems throughout their lives.
3. No convincing evidence was found by the Committee to support claims made by opponents of fluoridation with respect to deleterious health effects, other than in unusual and isolated instances.
4. Fluoridation of the public water supply is by far the most cost-effective method of fluoride delivery to the general public.
5. Your Committee reviewed the Brown and Caldwell study and discussed at some length the chemical compounds (including buffers) involved. While some alternative compounds could realistically be ruled out, there were several considered and cited in the study which we feel merit further review. For instance, sodium fluoride and sodium silicofluoride are being used in other Oregon communities.
6. The Committee feels the basic issue is whether to give up some degree of personal freedom to achieve a widespread health and economic benefit, or to leave the decision to use fluoride to individual choice.

<sup>11</sup> *Baer v. City of Bend*, 206 OR 211, 292 p. 2d 134, 1956.

<sup>12</sup> Ernest Newbrun, D.M.D. "Water Fluoridation and Fluoridation Supplements in Caries Prevention." *CDA Journal* 1979.

**VII. RECOMMENDATION**

Your Committee therefore recommends that the City Club support a *NO* vote on City Measure No. 51 in the May 1980 primary election.

Provided that the measure is defeated, the Committee recommends that the City of Portland examine closely the criteria used to select the fluoride-containing compound—a number of alternative compounds are available—and that the Multnomah County Health Service, as part of its ongoing monitoring of the community health status, take into consideration the addition of fluoride to the public water supply.

Respectfully submitted,  
Olive Barton  
George W. Dana, M.D.  
Jan K. Kitchel  
Charles J. Pruitt  
Myra N. Rose  
Lloyd B. Williams  
Ann D. Kottkamp, *Chairman*

Approved for publication by the Research Board on March 20, 1980 and authorized by the Board of Governors for distribution to the membership for discussion and action on Friday, April 18, 1980.

## APPENDIX A

## PERSONS INTERVIEWED

Roger Burt, Co-Chairman, Citizens for Pure Water  
Walter L. Gabler, D.D.S., Professor of Biochemistry, U of O Health Sciences Center  
Robert Isman, D.D.S., Dental Health Officer, Multnomah County, and Chairman,  
Oregonians for Fluoridation  
Carl Goebel, Administrator, Portland Bureau of Water Works  
Paul Norseth, Chief Engineer, Portland Bureau of Water Works  
Virginia Alzner, Staff Assistant, Commissioner Mosee's Office, Multnomah County  
Edward Wah, D.M.D., Portland  
Jack Gamby, M.D., Eugene  
Charles Schade, M.D., Multnomah County Health Department.  
Jerry L. Schlessler, N.D., D.C., Naturopathic Medical Group, Portland  
Frank Sisler, M.D., Portland  
Irl Clary, D.D.S., Portland

## APPENDIX B

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## APPENDIX C

### GLOSSARY

- Acid*: a compound which, in aqueous solution, undergoes dissociation with the formation of hydrogen ions.
- Buffer*: a chemical system that prevents change in the concentration of another chemical substance; in this instance, a chemical that maintains pH balance.
- Dental caries*: dental decay; cavities (a disease of the calcified tissues of the teeth characterized by decalcification of the inorganic portions of the teeth and accompanied or followed by disintegration of the organic portion).
- Dissociation*: process by which a chemical compound breaks up into simpler constituents.
- DMF*: decayed, missing, filled.
- Fluoridation*: the addition of fluoride to the public water supply as part of the public health program to prevent or reduce the incidence of dental caries.
- Fluoride or F ion*: a fluorine atom that has gained an electron giving it a charge of negative electricity.
- Fluosilicic Acid and Hydrofluosilic Acid*: Synonyms for the compound  $\text{H}_2\text{SiF}_6$ .
- Ion*: an atom or a group of atoms that have lost an electron or electrons resulting in a positive electrical charge or gained an electron or electrons resulting in a negative electrical charge.
- Mottling*: a condition of spotting with patches of color.
- Ppm*: parts per million.
- Systemic fluoride*: Treatment of the body as a whole, internally; in this case, treatment such as fluoride in a water supply or any addition of fluoride drops or tablets. Systemic treatments alter the structure of teeth as they develop to strengthen tooth enamel as it forms.
- Topical fluoride*: Surface or external treatment; in this case, treatments such as fluoride toothpaste, fluoride mouthrinse and fluoride applications by a dentist. Topical treatments strengthen the tooth enamel after it has formed but do not involve a change in structure of the tooth as it develops.

**APPENDIX D****COMMUNITIES OR WATER DISTRICTS WITH  
NATURALLY FLUORIDATED WATER (0.7-1.0 ppm)**

| CITY                       | COUNTY   | POPULATION |
|----------------------------|----------|------------|
| Adams                      | Umatilla | 255        |
| Adrian                     | Malheur  | 200        |
| Arlington                  | Gilliam  | 605        |
| Athena                     | Umatilla | 975        |
| Boardman                   | Morrow   | 1,295      |
| Big Eddy Water District    | Wasco    | 550*       |
| Chenoweth Irrigation Co-op | Wasco    | 2,500*     |
| Dufur                      | Wasco    | 600        |
| Echo                       | Umatilla | 500        |
| Fort Klamath               | Klamath  | 200*       |
| Fossil                     | Wheeler  | 680        |
| Heppner                    | Morrow   | 1,730      |
| Hermiston                  | Umatilla | 8,150      |
| Huntington                 | Baker    | 580        |
| Irrigon                    | Morrow   | 515        |
| Jordan Valley              | Malheur  | 295        |
| Lakeview                   | Lake     | 3,000      |
| Mayview                    | Gilliam  | 50*        |
| McNary                     | Umatilla | 300*       |
| Nyssa                      | Malheur  | 3,000      |
| Ontario                    | Malheur  | 8,950      |
| Seneca                     | Grant    | 390        |
| Stanfield                  | Umatilla | 1,350      |
| Umatilla                   | Umatilla | 2,920      |
| Umatilla Army Depot        | Umatilla | 100*       |
| TOTAL:                     |          | 39,690     |

\*Population figures represent estimates because they are either  
 1) a water district (records are in number of outlets, not people served) or  
 2) an unincorporated city.

NOTE: In the case of Big Eddy Water District, it will be included in The Dalles Water District eventually. The vote has been taken; however, the connections are not constructed. Big Eddy is *not* located within the city limits of The Dalles.

## APPENDIX D (Cont'd)

COMMUNITIES  $\geq$  500 POPULATION WHICH ADJUST FLUORIDE

| CITY                  | COUNTY     | POPULATION | TYPE OF FLUORIDE                             | DATE OF FLUORIDATION |
|-----------------------|------------|------------|--|----------------------|
| Albany                | Linn       | 26,150     | Na <sub>2</sub> SiF <sub>6</sub> *, dry feed | November 1964        |
| Astoria               | Clatsop    | 10,800     | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | December 1952        |
| Coos Bay              | Coos       | 15,300     | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | January 1957         |
| Eastside              |            | 1,680      |  |                      |
| North Bend            |            | 10,300     |  |                      |
| Coquille              | Coos       | 4,700      | Na <sub>2</sub> SiF <sub>6</sub> *, dry feed | May 1954             |
| Corvallis             | Benton     | 40,500     | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | June 1952            |
| Dallas                | Polk       | 9,000      | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | September 1956       |
| Florence              | Lane       | 3,900      | NaF, solution tank                           | June 1952            |
| Forest Grove          | Washington | 11,250     | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | October 1952         |
| Gold Beach            | Curry      | 2,170      | NaF, solution tank                           | September 1963       |
| Kingsley Field AFB    | Klamath    | 1,100      | NaF, solution tank                           | January 1963         |
| McMinnville           | Yamhill    | 14,350     | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | October 1961         |
| Mill City             | Linn       | 1,630      | NaF, saturator                               | March 1954           |
| Monmouth              | Polk       | 6,700      | NaF, solution tank                           | May 1970             |
| Newport               | Lincoln    | 7,150      | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | July 1962            |
| Pendleton             | Umatilla   | 15,000     | H <sub>2</sub> SiF <sub>6</sub> , acid       | December 1952        |
| Salem                 | Marion     | 90,000     | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | January 1953         |
| Kaiser Water District |            | 4,700      |  |                      |
| Turner                |            | 1,150      |  |                      |
| Sheridan              | Yamhill    | 2,360      | NaF, solution tank                           | January 1966         |
| Silverton             | Marion     | 5,480      | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | March 1972           |
| Sublimity             | Marion     | 1,150      | NaF, solution tank                           | July 1955            |
| Sweet Home            | Linn       | 7,250      | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | November 1964        |
| The Dalles            | Wasco      | 11,400     | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | January 1957         |
| Warm Springs (BIA)    | Jefferson  | 1,500      | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | December 1962        |
| Warrenton             | Clatsop    | 1,500      | Na <sub>2</sub> SiF <sub>6</sub> , dry feed  | January 1956         |
| Gearhart              |            | 890        |  |                      |
| Hammond               |            | 560        |  |                      |
| Wolf Creek Water D.   | Washington | 39,400     | NaF, dry feed                                | June 1964            |

TOTAL: 350,020

\*NaF = sodium fluoride; Na<sub>2</sub>SiF<sub>6</sub> = sodium silicofluoride.

Source: Oregon State Health Division, August, 1979.

**APPENDIX E****NATIONAL AND INTERNATIONAL ORGANIZATIONS  
ENDORISING FLUORIDATION**

American Academy of Allergy  
American Academy of Pediatrics  
American Academy of Pedodontics  
American Association for the Advancement of Science  
American Association of Dental Schools  
American Association of Industrial Dentists  
American Association of Public Health Dentists  
American Association of University Women  
American Dental Association  
American Dental Health Society  
American Dental Hygienists' Association  
AFL-CIO  
American Heart Association  
American Hospital Association  
American Institute of Nutrition  
American Legion  
American Medical Association  
American Nurses Association  
American Osteopathic Association  
American Pharmaceutical Association  
American Public Health Association  
American Public Welfare Association  
American School Health Association  
American Society of Dentistry for Children  
American Veterinary Medical Association  
American Water Works Association  
Association of Public Health Veterinarians  
Association of State and Territorial Health Officers  
Canadian Dental Association  
Canadian Medical Association  
Canadian Public Health Association  
College of American Pathologists  
Great Britain Ministry of Health  
Health Insurance Institute of America  
Health League of Canada  
International Dental Federation  
Board of Governors, Mayo Clinic  
National Commission on Community Health Services  
National Congress of Parents and Teachers  
National Education Association  
National Health Council  
National Institute of Municipal Law Officers  
National Nutrition Consortium  
National Research Council  
Pan American Health Organization  
Society of Toxicology